

211438

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

<http://www.cdph.state.co.us/hm/>

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-3300
Fax (303) 759-5355

222 S. 6th Street, Room 232
Grand Junction, Colorado 81501-2768
Phone (970) 248-7164
Fax (970) 248-7198

SEP 11 22 PM 1:17
SUPERIOR BRANCH



Colorado Department
of Public Health
and Environment

June 18, 1999

Ms. Bonita Lavelle
U.S. EPA Region 8
999 18th Street, Suite 500
Denver, CO 80202-2405

Re: Draft Project Plan for the Vasquez Boulevard & I-70 Site Denver, CO
Pilot-Scale Soil Characterization Study

Dear Ms. Lavelle:

The Colorado Department of Public Health and Environment has received and reviewed the above-referenced document. Our Specific Comments are attached, and our General Comments follow:

As clarified in our June 14, 1999 working group meeting, the original objective of this pilot study is to develop a diagnostic tool, using archived soil samples from various source areas and from residential soils with the highest and lowest arsenic concentrations. At the meeting it was decided that additional smelter site sampling would also be done. The goal is to characterize certain physical and chemical properties of off-site and on-site soils/materials and determine whether it is plausible, based on the results of the pilot study, that statistically significant differences in these parameters could be detected in subsequent investigative studies.

As discussed at the June 14th meeting, because of the potential for a complex mixture of multiple exposure sources at this site, it may not be appropriate to generalize the results of the physical-chemical soil characterization from the highest arsenic soils to intermediate concentration ranges, or soils which are clearly higher than background concentrations but not "hotspots". The state continues to be concerned that the proposed study design may, in fact, greatly limit the ability to draw conclusions about the usefulness of further study or may even result in misleading conclusions. Under the current protocol, it would be particularly difficult to know how to interpret negative conclusions to the hypotheses to be "tested" in regards to the usefulness of further investigations. The state believes additional investigation of intermediate range soils (i.e., 150-450 ppm As) as part of this pilot study and including characterization of these soils in the DQOs would greatly improve the usability of this study and could help streamline the investigation process.

Ms. Lavelle

6/18/99

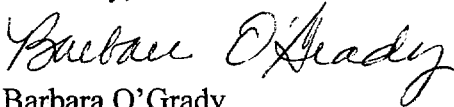
page 2

In addition to the information contained in the report, EPA should provide as an Addendum to the Plan a copy of the residential arsenic sampling results from the Murray and Sandy Smelters. These smelters were located close to where PAX was manufactured, and PAX likely was available for purchase in these communities.

As you are aware, CDPHE commissioned a report, dated June 8, 1998, analyzing Asarco Inc.'s efforts to demonstrate that the source of arsenic in south Globeville was PAX 3-year Crabgrass Control. A copy of the report is attached to these comments. The state requests that the speciation results obtained by Dr. Drexler be incorporated into the Project Plan.

We appreciate the opportunity to review the Project Plan. Please feel free to contact me at (303) 692-3395 if you have any questions about our comments.

Sincerely,



Barbara O'Grady

State Remedial Project Manager

Asarco-Globe and VB/I-70

cc: without enclosure*

- Mr. Robert Litle, Asarco
- Ms. Linda Larsen, Asarco
- Dr. David Mellard, ATSDR
- Ms. Susan Muza, ATSDR
- Ms. Celia VanDerLoop, Denver
- Ms. Joan Hooker
- Mr. Anthony Thomas
- Ms. Sandy Douglas
- Ms. Melissa Munoz
- Mr. Michael Maes
- Dr. Chuck Patterson
- Ms. Toni Riley
- Ms. Frances Hartogh, AGO
- Ms. Jane Mitchell, CDPHE/DCEED
- Ms. Debbie Gomez
- Ms. Lorraine Granado
- Mr. Matthew Cohn, USEPA
- Dr. Chris Weiss, USEPA

* The Drexler Report referred to above will be distributed to the Working Group on July 15th.

STATE OF COLORADO COMMENTS
on USEPA Draft Project Plan for the Vasquez Blvd. and I-70 Site, Denver, Colorado,
Pilot-Scale Soil Characterization Study,
June 1, 1999.

1.0 Introduction:

The EPA has frequently pointed out the significance of the Vasquez Boulevard/I-70 Working Group. Therefore, it would be more accurate and appropriate to revise the first sentence of the report to read "The U.S. Environmental Protection Agency (EPA) Region 8 in cooperation with the Vasquez Boulevard/I-70 (VB/I-70) Working Group (CCOD, CDPHE, Asarco, ATSDR, COPEEN and members of the public) is working to determine..."

The fourth and fifth lines should be revised to read: "...to determine if residential soils and contamination in residential soils may be reliably distinguished from source soils and other potential sources of contamination...."

1.2 Project Background:

The second sentence of the second paragraph should be revised to read: "Past environmental studies conducted by EPA..."

1.3 Project Description:

The fourth and sixth lines should be revised to read: "...characteristics to distinguish between residential soils (and the contamination therein) and potential sources...various solid materials including residential soils (and the contamination therein), on-smelter soils (and materials)...."

1.3.1 General Study Objectives:

a) General Objective #1:

General Objective #1 calls for a measure of the frequency of occurrence of perlite present in each soil or material type. For this to be useful or reliable information, it will be important to characterize soils in terms of location (i.e., garden soil or flower beds where soil amendments may have been used) and whether there is evidence that soils are native or disturbed.

The "Generalized Surficial Geologic Map of the Denver Area, Colorado" by G.H. Chase and J.A. McConaghy shows three dominant lithologies covering both the Globe Plant site and the adjacent neighborhoods. If materials found at a high arsenic residence are determined to be allochthonous, closely resembling those which dominate the plant site, not the adjacent properties, some conclusion could be reached that they were somehow transported there. A complicating factor, however, is that on cursory review, all three

dominant lithologies appear to be present at the Globe Plant site. Promising is that all three lithologies have very distinct mineralogies making them easily distinguishable.

1. The second line should be revised to read: "...physical and chemical attributes associated with residential soils (and contamination)."
2. First bullet: Soil color and profile analysis also should be performed.
3. Third bullet: Perlite is a highly-ubiquitous substance in purchased topsoil, and consequently its use to determine if PAX product was placed on the contaminated properties is questionable.

General Objective #2:

- 1: Third line: After the words "residential soils" add "and contamination therein." Where appropriate, these words should be added after each reference to residential soils to indicate that EPA will analyze not just residential soils but also the contaminants in these soils.
- 2: Second Bullet, third line: After the word "levels" add "and types of arsenic."

General Objective #3 :

General Objective #3 calls for characterizing a composite sample from one intensively sampled residence that contained high arsenic levels in soil for use in bioavailability studies. Since this work will be done to support risk assessment by providing a more site-specific estimate of the bioavailability of arsenic, it is important to characterize a representative range of soil concentrations and types which may well have important variations in physical and chemical characteristics (i.e., pH, particle size, speciation, etc.) that could influence bioavailability. Assuming a linear relationship and extrapolating to lower soil concentrations based on one composite sample is not likely to be an accurate estimate of site-specific conditions. It may be beneficial to use the results of the other portions of this pilot study to develop a more representative approach for assessing bioavailability

Also, Objective #3 states that a composite will be collected from a single residence with high arsenic soils. However subsequent discussions of bioavailability DQOs state that characterization will be done to support determination of bioavailability for both arsenic and lead. If this is so, this objective should be rewritten to include lead, and subsequent sections should clarify whether the protocol for this pilot study will be the same for both metals (i.e., will the same composite sample be used?).

Section 2.1 Study Design Summary:

Second paragraph: This paragraph should be revised to indicate that field sampling will be done at the other smelter sites (Globe, Omaha Grant, and (if soil is available) Argo).

Table 2.1.1 The silica/perlite quantification of PAX is not included.

Section 2.3 Sample Selection:

On-smelter facility:

Where possible the EPA should attempt to acquire new on-site soil, stack, or product samples rather than to rely solely on samples that have been archived potentially for many years. Samples should be taken from the former location of the Omaha Grant stack and from the following locations at the Globe Plant: the existing stack (at various elevations) and the former arsenic kitchens and arsenic flue. CDPHE will make available splits of samples from the former arsenic kitchen/arsenic flue area (splits are available through Dr. John Drexler and CU-Boulder) and splits of soil samples from other areas of the Globe Plant taken as part of the RD-RI/FS process for selecting the Globe site remedy. Samples of arsenic-bearing product should be obtained from the Globe, Omaha Grant, Murray, and Tacoma smelters under EPA's 104(e) authority

Based on the length and variability in historical activity at one of the potential source sites (the Globe plant) the state believes that on-smelter facility samples should be collected so as to geochemically characterize any major facility changes in production.

SOP's for surface soil sampling and smelter material sampling are absent.

Section 2.3.1 Residential Soils:

2) It is unclear why EPA chose 70 ppm arsenic as the upper limit for so-called "low arsenic properties," since 70 ppm is well above background levels of arsenic. The 70 mg/kg concentration is far above a geochemically reasonable background for this area, therefore these "low arsenic" properties are contaminated. If the intent of the Study Plan is to determine if fingerprinting can be used to detect arsenic sources, uncontaminated properties (at least with arsenic less than 28 ppm) would be more useful. This comment applies to all references in the Study Plan to "low arsenic properties." In addition, CDPHE recommends that properties with arsenic in the mid-range (e.g. 100 - 450 ppm) be studied as well, since very high levels of arsenic may mask the source of lower levels.

3) It will be important to characterize the "randomly selected properties" in terms of geographic location to help determine whether these samples are representative of random variability in soil characteristics across the site or a result of specific hydro-geological features associated with a specific location on the site. It will also be important to characterize the soil horizon for samples used to investigate "boundary effects".

Table 2.3.2 Associated maps for sample locations are missing.

Figures 2.3.1-2.3.6 are not referenced in the text. What is their significance to the project plan?

Page 2-7 Randomly Selected Properties, second sentence, end of the second line, delete “a”.

Section 2.3.3 Potential Source Materials:

In the first sentence beginning “Any source material...” change the verb from “are” to “is”.

The text correctly states that potential sources include both material(s) from smelter-related activities and arsenical pesticides. It is unclear why EPA has chosen PAX to “represent” potential source material. Further the text identifies all known smelters in the area (Globe-Omaha/Grant-Argo) but only chooses one pesticide. The state is concerned that this is a significant error in judgement that is likely to bias the results. If evidence exists to suggest that PAX was either the only nor the most commonly marketed arsenical pesticide in the Denver area during the period of ~1900-1975, it should be included in the text..

What research has EPA conducted to determine if PAX is the most representative of other source materials? Was PAX found in residential areas of other smelter sites? What are EPA’s plans to sample other neighborhood for PAX, where there could be no interference from smelter sources? Also, the reference here and in Section 2.3.3.2 to “[s]ome” having suggested PAX as a source is unclear. Who, other than Asarco, suggested that PAX is a potential source?

Section 2.3.3.1:

Last sentence of first paragraph: The arsenic trioxide from the Tacoma, Globe, and Murray/Sandy smelters should be speciated for metals as well.

Section 2.3.3.1:

1) Both references to on-smelter facility soils should include the words “and materials in these soils.”

3) The last two lines should be revised to read: “...dumped; used on residential properties either for fill material, as a soil amendment, or as an herbicide/pesticide; or in preparation of the herbicide PAX....”

Section 2.3.3.2 PAX:

What is the composition of PAX and how often has it changed over the 21 years it was produced? The text refers to the active ingredients in PAX 3 Year Crabgrass Control. What other identifiable constituents (eg. perlite) are present and in what proportions? The sample obtained by EPA may only represent PAX 3 Year Crabgrass. Stadtherr, 1963 references an “Improved Pax with AR-76 and chlordane”. The term “improved” implies previous formulae—how many times has the product changed and how could those changes bias the results? Please describe what research EPA has conducted to determine the various formulations of arsenic trioxide-bearing PAX over the 20+ years it was marketed. According to information obtained by the state, the PAX brand included:

Super PAX Crabgrass Control
PAX Crabgrass Control
PAX Total for Lawns
PAX 3-Year Crabgrass Control
PAX Lawn Food Pellets
PAX Action Weed 'N Feed
PAX Total Crabgrass Control
PAX Crabgrass & Soil Pest Control
PAX Pride Fertilizer
PAX Action
PAX Full Season Crabgrass Control

Section 2.4 Bulk Soil Characterization:

Reference to XRF in Table 2.4.1 should be XRD (x-ray diffraction).

Page 2-23, first line, first full sentence, change “a” to “as”.

The reference to the “Mineralogy of sands, gravels and clays” is incorrect. The methods described in this section are to determine the mineral form of the dominant CLAY minerals and have nothing to do with the classification of soils. Please revise the text accordingly.

The SOP for the “Quantification of perlite and silica sand” is not provided.

The particle size distribution for perlite should be determined in addition to the fraction of perlite.

Please provide the rationale for running TGA, DSC, or DTA?

Section 2.5.1:

Mercury analysis will not be possible using archived soil samples because sample holding times have been exceeded. Is this important for establishing a “fingerprint” for residential soils and other known sources?

Section 2.5.2 Geochemical Speciation of Arsenic and Lead:

Speciation should be expanded to include Pb, As, Cd and Zn speciation along with more general mineral characterization of each sample. Using EMPA speciation techniques the relative metal mass can be determined for the above metals of concern along with morphological and particle size data. Additional mineral characterization could include, but not be limited to, the identification of normal soil minerals (perlite) and any rare mineral forms such as those containing the elements: In, Tl, Hg, or Se.

Section 2.5.2:

We understand that EPA has elected to place in the SOP much of the detail regarding which metals will be looked for in speciation, but the SOP is not altogether clear. Please verify that, in addition to arsenic trioxide and lead arsenic, particle counts will be done for indium, selenium, thallium, antimony, and mercury. Also, we understand that the speciation will be conducted by Dr. John Drexler.

Section 2.5.3:

Does EPA intend to use PAX in its bioaccessibility tests? If so, given the small amount of PAX available, would it not be more advisable to analyze the PAX sample and recreate a portion of PAX for use in these other tests?

Section 2.5.4 Stable Isotope Ratios for Lead:

This section states that lead appears to co-occur with arsenic. The state is not aware of any information that has been presented to the work group about the co-location of metals. This would be useful information to put in an appendix to this report since the same soil samples are being proposed to characterize both metals. While the statement “past investigations reveal that lead appears to be co-occur with arsenic” is true, some data indicate that they do not correlate. Therefore, they may not be diagnostic in source attribution.

Because many potential contributors to lead exist at this site (paint, leaded gasoline, Globe Smelter, Argo Smelter, Omaha-Grant Smelter and pesticides, the state is concerned that bulk lead isotope analysis will be very difficult to interpret and may not provide diagnostic attribution data. Further, lead from pesticides or the Globe smelter could have come from dozens of different deposits within North America. Interpretation of the bulk isotopic signature without signatures from the various endpoints will be impossible, and with such a large number of sources an apportionment is very difficult.

Data Gaps:

The state understands that this is a pilot study, however, without certain information it will be very difficult for the team to interpret the results and develop a consensus. Therefore, we propose the inclusion of the following information:

- Identify all PAX formulas (completely)
- Identify other potential arsenical pesticides
- Detailed column studies on site specific soils
- Identify all potential sources of perlite